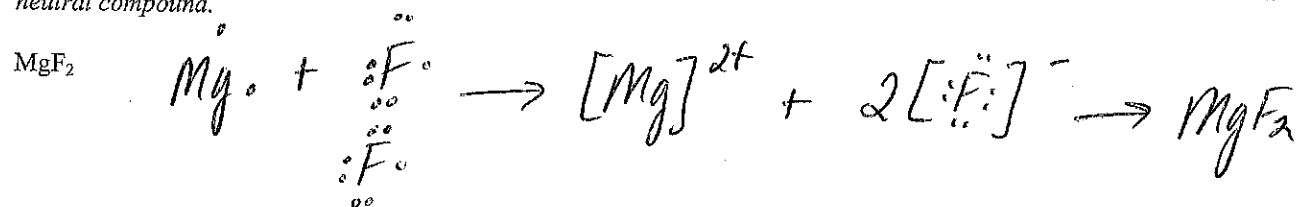
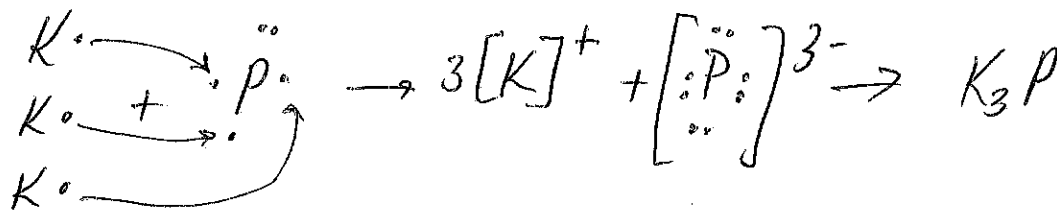
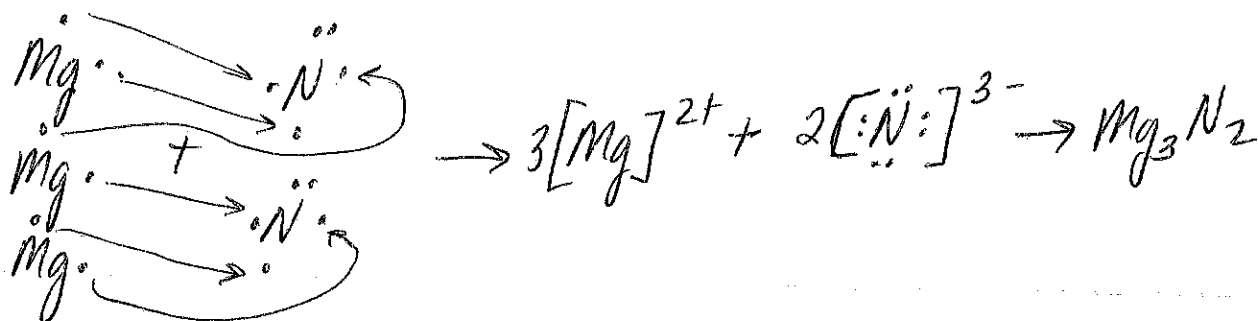
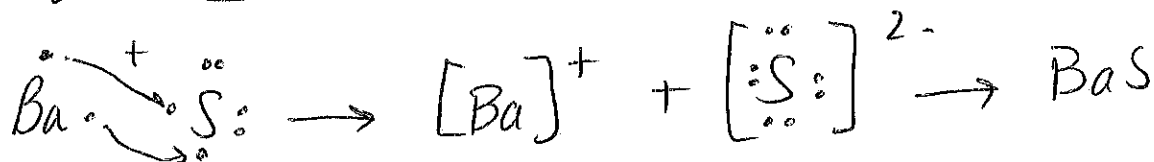
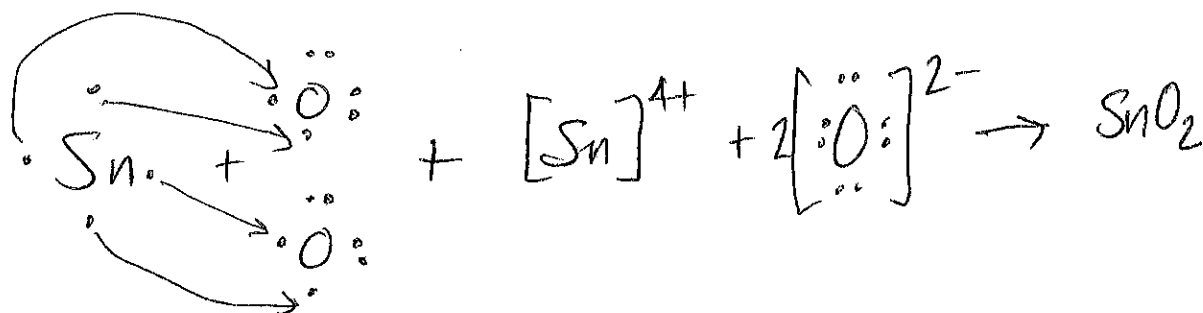


Using Lithium Bromide (LiBr) as an example, write the ionic equations for the following formula units. Keep in mind that not every combination of cation and anion is 1:1, so you may need multiples of one or each atom to create a neutral compound.

MgF<sub>2</sub>K<sub>3</sub>PMg<sub>3</sub>N<sub>2</sub>

BaS

SnO<sub>2</sub>

## Molecular Compounds

When naming binary molecular compounds, always name the more metallic atom first.  
or least electronegative

### Naming Rules

1. If there is more than one of the 1<sup>st</sup> atom, precede the atom name by the appropriate prefix (di, tri, tetra, penta, hexa, hepta, octa, nona, deca)

Example:  $C_6O_2$       hexacarbon dioxide

2. If there is only one of the first atom, do not precede the atom name by mono.

$CO_2$  = monocarbon dioxide

$CO_2$  = carbon dioxide

3. Precede the second atom name by the appropriate prefix, including mono if there is only one of that atom. Drop the last syllable (or 2) and add -ide to the element name

$C_2O$  Dicarbon monoxide

Element	Name	Element	Name
C	Carbide	S	Sulfide
N	Nitride	Cl	Chloride
O	Oxide	Se	Selenide
F	Fluoride	Br	Bromide
P	Phosphide	I	Iodide

Provide the name of the following molecular compounds

Compound	Compound Name
$P_6O_3$	Hexaphosphorus trioxide
$NS_4$	Nitrogen tetrasulfide
$Se_8O$	Octaselenium monoxide
$C_7Br_5$	heptacarbon pentabromide
$S_2F_2$	disulfur difluoride

Provide the Chemical Formulas given the following names

Compound Name	Compound
Dinitrogen monofluoride	$N_2F$
Nonaphosphorus decachloride	$P_9Cl_{10}$
Sulfur hexabromide	$SBr_6$
Tetracarbon pentasulfide	$C_4S_5$
Octanitrogen trifluoride	$N_{10}F_3$

## Ionic Compounds

Ionic compounds form from the combination of metal and non-metal.  
 Atoms that lose electrons are called cations and have a positive charge.  
 Atoms that gain electrons are called anions and have a negative charge.

### Naming ionic compounds with metals that only form one ion

1. State the name of the first atom
2. Drop the last syllable (or 2) from the second atom name and add -ide

Element	Name	Element	Name
C	Carbide	S	Sulfide
N	Nitride	Cl	Chloride
O	Oxide	Se	Selenide
F	Fluoride	Br	Bromide
P	Phosphide	I	Iodide

### Name the following ionic compounds

Compound	Compound Name
$\text{CaBr}_2$	Calcium Bromide
$\text{Na}_2\text{O}$	Sodium oxide
$\text{Ag}_2\text{S}$	Silver Sulfide
$\text{K}_3\text{P}$	Potassium phosphide
$\text{Al}_2\text{N}_3$	Aluminum nitride

### Given the compound name, identify the ions involved and provide the chemical formula

Compound Name	Cation	Anion	Compound
Beryllium Chloride	$\text{Be}^{2+}$	$\text{Cl}^-$	$\text{BeCl}_2$
Sodium Sulfide	$\text{Na}^+$	$\text{S}^{2-}$	$\text{Na}_2\text{S}$
Lithium Phosphide	$\text{Li}^+$	$\text{P}^{3-}$	$\text{Li}_3\text{P}$
Magnesium Nitride	$\text{Mg}^{2+}$	$\text{N}^{3-}$	$\text{Mg}_3\text{N}_2$
Calcium Oxide	$\text{Ca}^{2+}$	$\text{O}^{2-}$	$\text{CaO}$

# Naming Ionic Compounds Using the Stock System (for atoms that have more than one possible charge)

Element	1+	2+	3+	4+
Copper (Cu)	X	X		
Chromium (Cr)		X	X	
Iron (Fe)		X	X	
Lead (Pb)		X		X
Tin (Sn)		X		X

Follow the 1<sup>st</sup> atom name by the Roman numeral that represents its charge in parenthesis

Example      Copper (I) Chloride = CuCl      or      Copper (II) Chloride = CuCl<sub>2</sub>

Name the following ionic compounds using the stock system

Compound	Cation	Anion	Name
FeCl <sub>2</sub>	Fe <sup>2+</sup>	Cl <sup>-</sup>	Iron (II) Chloride
PbF <sub>4</sub>	Pb <sup>4+</sup>	F <sup>-</sup>	lead(IV) fluoride
Sn <sub>3</sub> P <sub>2</sub>	Sn <sup>2+</sup>	P <sup>3-</sup>	Tin (II) phosphide
CoO	Co <sup>2+</sup>	O <sup>2-</sup>	Cobalt (II) oxide
CrP	Cr <sup>3+</sup>	P <sup>3-</sup>	chromium (III) phosphide

Provide the chemical formula give the names of the following ionic compounds

Name	Cation	Anion	Compound
Copper (II) Nitride	Cu <sup>2+</sup>	N <sup>3-</sup>	Cu <sub>3</sub> N <sub>2</sub>
Tin (IV) Oxide	Sn <sup>4+</sup>	O <sup>2-</sup>	SnO <sub>2</sub>
Lead (II) Iodide	Pb <sup>2+</sup>	I <sup>-</sup>	PbI <sub>2</sub>
Chromium (III) Phosphide	Cr <sup>3+</sup>	P <sup>3-</sup>	CrP
Iron (III) Bromide	Fe <sup>3+</sup>	Br <sup>-</sup>	FeBr <sub>3</sub>

## Ionic compounds that contain polyatomic cations or anions

There is only one polyatomic cation,  $\text{NH}_4^+$  (ammonium ion)

When naming polyatomic anions, the charge for each member of a pair is the same. The ions differ by the number of atoms each member contains.

Example:  $\text{SO}_3^{2-}$  and  $\text{SO}_4^{2-}$

The name of the member of the pair with the fewer number of atoms ends in -ite, the other ends in -ate.

$\text{SO}_3^{2-}$  (sulfite) and  $\text{SO}_4^{2-}$  (Sulfate)

When forming compounds with polyatomic ions, place parenthesis around the entire ion before attempting to add subscripts (balance the charges)

**Provide the names of the following compounds which contain polyatomic ions**

Compound	Cation	Anion	Name
$\text{Ba}(\text{NO}_3)_2$	$\text{Ba}^{2+}$	$\text{NO}_3^-$	Barium Nitrate
$\text{MgSO}_3$	$\text{Mg}^{2+}$	$\text{SO}_3^{2-}$	Magnesium sulfite
$(\text{NH}_4)_3\text{P}$	$\text{NH}_4^+$	$\text{P}^{3-}$	Ammonium phosphide
$\text{NaCN}$	$\text{Na}^+$	$\text{CN}^-$	Sodium cyanide
$\text{Pb}(\text{HPO}_4)_2$	$\text{Pb}^{2+}$	$\text{HPO}_4^-$	Lead(II) hydrogen phosphate

**Form the compound containing polyatomic ions given the names**

Name	Cation	Anion	Compound
Magnesium Phosphate	$\text{Mg}^{2+}$	$\text{PO}_4^{3-}$	$\text{Mg}_3(\text{PO}_4)_2$
Ammonium Sulfite	$\text{NH}_4^+$	$\text{SO}_3^{2-}$	$(\text{NH}_4)_2\text{SO}_3$
Calcium Oxalate	$\text{Ca}^{2+}$	$\text{C}_2\text{O}_4^{2-}$	$\text{CaC}_2\text{O}_4$
Lithium Bicarbonate	$\text{Li}^+$	$\text{HCO}_3^-$	$\text{LiHCO}_3$
Aluminum Permanganate	$\text{Al}^{3+}$	$\text{MnO}_4^-$	$\text{Al}(\text{MnO}_4)_3$

## Acids

- An acid is a substance that produces  $H^+$  ions in solution.
- There are two common types of acids – Binary (hydrogen plus a monatomic anion or a polyatomic anion that does not contain oxygen, ex. HCl or HCN) and oxyacids (hydrogen plus a polyatomic anion containing oxygen, ex.  $HNO_3$ )

### Naming Binary Acids

1. Hydro- is the prefix of all binary acids
2. Change the ending of the nonmetal to -ic.

### Naming Oxyacids

1. There is no prefix for oxyacids
2. -ate anions are -ic acids (ex.  $H_2SO_4$  = sulfuric acid)
3. -ite anions are -ous acids (ex.  $H_2SO_3$  = sulfurous acid)

Name	Cation	Anion	Compound
Phosphoric Acid	$H^+$	$PO_4^{3-}$	$H_3PO_4$
Hydrobromic Acid	$H^+$	$Br^-$	HBr
Hydroiodic Acid	$H^+$	$I^-$	HI
Sulfurous acid	$H^+$	$SO_3^{2-}$	$H_2SO_3$